

# DAVE DERRICK

## River Research and Design Inc.

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### Biography

**Position and Work Experience:** Mr. Derrick graduated with a B. S. Civil Engineering degree in 1978 from Villanova University, Villanova, Pennsylvania and has been employed continuously at the U.S. Army Corps of Engineers Research and Development Center since June of 1978 where he now holds the position of Research Hydraulic Engineer in the Coastal and Hydraulics Lab (CHL). Mr. Derrick also holds the position of Vice President, River Research and Design, Inc., an A & E firm specializing in river and stream stabilization/ restoration.

He specializes in innovative, environmentally compatible, and cost-effective approaches and methodologies to river and stream bank stabilization; stream investigation and analysis using principles of fluvial geomorphology; development of function-based project design goals; project facilitation and conflict resolution; sediment transport; navigation channel improvement effects of river training structures; innovative construction methodologies for stream stabilization works; use of redirective techniques to protect roads, bridges, and pipelines, river and stream training structure inspection, monitoring, and performance analysis; and physical movable-bed modeling.

Mr. Derrick has also been involved in several dam removal projects, karst topography (sinkhole) situations, arid dry-wash restorations, fisherman ingress and egress designs, and salmon and trout stream and riparian corridor restoration. His knowledge and practical experience ranges from the Mississippi River to the very smallest of streams.

Mr. Derrick has developed and refined the following cost-effective streambank protection techniques: Living Half-Drowned Bushes; Two-Stage Slit Trench Pole Plantings; wide-trench pole and rooted stock plantings; Turkey Foot Trench Planting Configurations; Slit Brush Layering; Living Log Corner Crossers; Tree Down Bank Flops; the Willow Curtain and Willow Pole bioengineering methodologies; machine-placed and minimal-stone (hand-placed) Bendway Weirs; tree trunk Bendway Weirs (5 variations); Traffic Control Stones; Thalweg Control Stones; geotextile bag Bendway Weirs; two-stage Bendway Weirs; minimal Longitudinal Peaked Stone Toe Protection (LPSTP at less than 1 ton/ft); LPSTP combined with rock vanes or Bendway Weirs; and LPSTP combined with vegetated benches and spur dikes for desert environments.

Mr. Derrick has been instrumental in pioneering the use of Bendway Weirs to redirect stream flow to protect highway bridge abutments and pipeline crossings. In most cases these projects have required a combination of techniques. Mr. Derrick has also used Single-Stone Bendway Weirs successfully on several projects.

For grade control Mr. Derrick has championed Viffles; (a combination cross vane and rocked riffle); Engineered Rock Riffles with all stones in compression (both end-to-end and imbricated compression); 3 tree trunk "Log Digger" Structures; Adjustable Engineered Rock Riffles; Adjustable Random Boulder Engineered Grade Control Structures; Single Row Stone Riffles; and Engineered Rock Riffles with Integrated Fishways (with pool and riffle sequences).

For restoration/aquatic habitat improvement projects Mr. Derrick has developed and refined the "Locked-Limb"; "Locked-Log"; "Locked-Log" with footer logs; Extreme Fuzzy Locked Logs; "Half-Dense" Riprap; "SSmooshed" riprap; "Instant Shade"; Extreme Instant Shade; "California" style LUNKERS; "Corner LUNKERS"; ADA accessible fishing platform "LUNKERS"; "Hydraulic Cover Stones" (5 types); "Wiggle" shoreline deflectors; "Align & Catch" log revetment pairings; "Squeezers"; "Missing Tooth" Stone Transverse bars; "Dense Fibrous Root Replication"; "Pushed Trees"; & Missouri River Kickers for small streams; many types of innovative fisherman access; vegetated, buried (soil-choked), and curved keys; vine cover for exposed stone, Duck Resting Rocks; Log Point Bar Enforcers; and Stone Point bar

Enforcers with integrated Living Dikes; and "Exclusionary Vegetation".

Perched precariously on the cutting edge, Mr. Derrick has worked tirelessly to explore techniques for pool creation in straight stretches and has developed the following methodologies: Contraction Stones; Stone "Squeezers"; Log "Squeezers"; "Kink" Kickers; Missing Tooth Smiles; Missing Tooth Smiles with downstream Hydraulic Cover Stone Splitters; Constructed Transverse Oblique Bars; Missing Tooth Transverse Oblique Bars; & Missouri River Kickers for smaller streams.

Mr. Derrick has also championed the following Abrupt Planform Modifiers: Angle Slams, Grand Slams, Boil-Up Pools, Wrong-Way Boil-Up Pools, Twin-Spin Boil-Up Pools & Slanted "T" Angle Slams with Stone Splitters.

Since 1988 Mr. Derrick has been instrumental in pioneering the use of Bendway Weirs to redirect stream flow to protect highways, bridge abutments and pipeline crossings. In most cases protection projects have required combinations of the aforementioned techniques.

For restoration/aquatic habitat improvement projects Mr. Derrick has developed and refined the "Locked-Limb"; "Locked-Log"; "Locked-Log" with footer logs; Fuzzy Locked Logs; "Instant Shade"; Contraction Stones; Extreme Instant Shade (umbrella shade); "California" style LUNKERS; Shadow Wall Stabilization; Thalweg Control Stones; "Corner LUNKERS"; "Leaner" Stones anchoring Log Revetment; Pre-dug and Overdug pools; ADA accessible fishing platform "LUNKERS"; "Hydraulic Cover Stones" (5 types); "Wiggle" shoreline deflectors; "Fingerling Escape Channels"; "Align & Catch" log revetment pairings, some with LUNKER Log roofs; Duck Resting Rocks; "Dense Fibrous Root Mass Replication"; "Pushed Trees"; whole tree/shrub transplantation; Half Drowned Bushes; Tree Down Bank Flop habitat areas; many types of innovative fisherman access including Patio Stones and Stepped Wall & Walking Wall areas; Bed Diversity Stones; vegetated, buried (soil-choked) and curved keys; and "Exclusionary Vegetation".

For pool creation in straight stretches Mr. Derrick has developed the following methodologies: Contraction Stones; Stone "Squeezers"; Log "Squeezers"; "Kink" Kickers; Missing Tooth Smiles; Missing Tooth Smiles with downstream Hydraulic Cover Stone Splitters; Constructed Transverse Oblique Bars; Missing Tooth Transverse Oblique Bars; Kinks; Missouri River Kickers for small streams; Log Point Bar Enforcers; and Stone Point bar Enforcers.

Mr. Derrick has also championed the following Abrupt Planform Modifiers: Boil-Up Pools; Angle Slams; Grand Slams; Wrong-Way Boil-Up Pools; Twin-Spin Boil-Up Pools & Half Slam-Half Spin Boil-Up Pools.

Most complex projects have involved many shareholders, including landowners and conservation groups, as well as local, county, state and federal agencies. In many cases Mr. Derrick acts as a facilitator to combine the skill sets and experience of these diverse assemblages of personnel, forming them into a skilled, interdisciplinary team.

Each year Mr. Derrick teaches, serves as the technical advisor, and coordinates 2 week-long training courses at ERDC: Streambank Erosion and Protection (taught twice a year), and Advanced Streambank Protection. In addition Mr. Derrick develops and teaches a number of 1 to 5 day classes on stream investigation, stabilization and restoration for a multitude of aquatic resource clients, both public and private, in the USA, reaching an audience of 500 to 900 people annually.

Recently Mr. Derrick has taught several hands-on workshops where 40 to 100 participants assist in planting and building from 300 to 1,000 ft of a restoration project. Examples include NYS-DOT Chenunda Creek-Wellsville NY (350 ft of bank and grade stabilization with 11 methods used, 1,600 plants installed); Onondaga Creek @ Nichol Rd Bridge, LaFayette NY (6 methods used, 2,740 plants installed all in 6 hrs); Goodwin Creek-Batesville MS (14 methods used, 1,500 plants installed); and Binghamton, NY-Belden & Osborne Hollow Creeks (8 methods used, 8,000 plants installed, June 2007).